

the different picture types is a predetermined one, said control operation not being totally depending on the allocation of quantity of the target amount of codes based on the global complexity measure for each of the picture, but in accordance with features of the sequence of moving pictures; and

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encoding means for encoding said each picture included in said sequence of moving pictures including said each picture using said quantizer step size furnished by said encoding control means and using either said each picture or prediction from a past intra-coded image and/or a predictive coded picture.

REMARKS

Claims 1-14 were rejected under 35 U.S.C. § 103 (a) as allegedly being unpatentable over Odaka et al. (U.S. Patent No. 5,317,397, hereinafter "Odaka") in view of Lee et al. (U.S. Patent No. 5,592,226, hereinafter "Lee"). Applicants respectfully traverse each of these rejections for at least the following reasons.

Claim 1 has been amended to further emphasize that unlike the prior art systems, the encoding control process defined in claim 1 is not totally dependent on the allocation of a target amount of codes based on the global complexity measure for each picture, but is controlled in accordance with features of the sequence of moving pictures. As previously discussed, the purpose of the present invention is to provide an encoding system that can control both picture quality and the amount of codes generated. To achieve this, the quantizer step size is first set to each of a plurality of picture types (e.g., I, P, B). It is controlled thereafter so that a ratio among the target

quantizer step sizes is set to a predetermined ratio in accordance with features of the sequence of moving pictures to be encoded. Thus, the amount of codes generated during the encoding operation of each of the plurality of pictures in a group of pictures (GOP) can be controlled, while maintaining the relative picture quality among the plurality of adjacent pictures in terms of time.

The Examiner has insisted that the Lee reference teaches a control scheme that takes the complexity found in the sequence of moving pictures, and adaptively allocates the proper amount of bits for encoding the sequence of moving pictures by changing to the proper quantization step. However, the Examiner has not addressed the deficiencies noted in the Lee in the Advisory Action. For example, the Lee process performs a comparison between the coding target frame f_c and the immediate past frame f_{c-1} or between the current frame f_c and the last reference frame f_{ref} . However, the detection of the motion between the frames as a whole is not performed at all, in contrast to the present invention.

Further, in the Advisory Action, the Examiner relies on the "teachings of Odaka and Lee taken as a whole for taking into account of the complexity of the the sequence of moving pictures so as to accurately, effectively, and efficiently encode the sequence of moving pictures while preserving high image quality", to render the present invention unpatentable. Applicants respectfully submit that Odaka and Lee when taken as a whole would not have motivated one of ordinary skill in the art to arrive at Applicants' claimed combinations absent impermissible hindsight reference to Applicants' specification.

Contrary to the Examiner's conclusions, it is Applicants' claimed combinations that should be taken as a whole. As stated in MPEP § 2141.02, in determining the differences between the prior art and the claims, the question under 35 U.S.C. 103 is not whether the differences themselves would have been obvious, but whether the claimed invention as a whole would have been obvious. Distilling an invention down to the "gist" or "thrust" of an invention disregards the requirement of analyzing the subject matter "as a whole." *W.L. Gore & Associates, Inc. v. Garlock, Inc.*, 721 F.2d 1540, 220 USPQ 303 (Fed. Cir. 1983), cert. denied, 469 U.S. 851 (1984). The Examiner has merely stated the "gist" of the present invention and used this to provide the motivation to extract and modify aspects of the Odaka and Lee references to allegedly arrive at Applicants' claimed combinations.

In addressing the teachings of the Odaka and Lee references as a "whole" the Examiner has failed to address specific teachings of these references. For example, the Lee reference discloses that it relies on special frame types (a total of 6, I1, I2, P1, P2, B1, and B2) and its special "TAMI" algorithm, as noted in column 9, lines 44-45. In considering the Odaka and Lee references as a "whole" the Examiner has ignored the incompatibility of these references.

As stated in MPEP § 2143.01, if the proposed modification would render the prior art invention being modified unsatisfactory for its intended purpose, then there is no suggestion or motivation to make the proposed modification. *In re Gordon*, 733 F.2d 900, 221 USPQ 1125 (Fed. Cir. 1984). Further, if the proposed modification or combination of the prior art would change the principle of operation of the prior art

invention being modified, then the teachings of the references are not sufficient to render the claims prima facie obvious. *In re Ratti*, 270 F.2d 810, 123 USPQ 349 (CCPA 1959).

As previously noted, the Odaka patent explicitly refers to three steps (col. 22, lines 51-57) that are performed for rate control as:

- (1) allocating an amount of bits (a bit rate) to N pictures from the picture to the B3 picture immediately before the next I picture;
- (2) allocating and updating an amount of bits for each picture; and
- (3) controlling the quantization step size in each picture by using a virtual buffer.

Therefore, the Odaka patent achieves this by updating the allocation rate of the amount of codes in such a manner so as to set the relationship among the I, P and B pictures to a predetermined constant relationship. The primary function of the encoding control processes of the Odaka system is to allocate the target amount of codes to each of the three picture types based on the global complexity measure that is a product of the number of generated bits and the respective quantizer step size.

In contrast to this "principle of operation" of the Odaka patent, the Lee reference relies on a custom set of frame definitions (i.e., six different frame Types, I1, I2, P1, P2, B1, and B2 are used). This in and of itself destroys the combinability of Odaka and Lee as alleged by the Examiner, because it would require that Odaka adopt the unconventional bit allocations of the additional

frames which would destroy the predetermined constant relationship between the conventional I, P and B frames.

Still further, in direct opposition to the predetermined constant relationship taught by Odaka, Lee explicitly teaches to vary the bit relationships and even control the bit rate by controlling the type of frames used, such as describe in column 3 lines 1-13, Clearly, this type of operation of Lee is in direct opposition to the principles of the Odaka patent.

Therefore, even taken as a "whole" the teachings of these references are not sufficient to render the claims prima facie obvious, even if the alleged combination did yield Applicants' claimed combinations, which it does not. Accordingly, Applicants respectfully request the Examiner to reconsider and withdraw this rejection.

The remaining dependent claims are allowable at least by virtue of their dependency on the above-identified independent claims. See MPEP § 2143.01. Moreover, these claims recite additional subject matter, which is not suggested by the documents taken either alone or in combination.

Entry of the above amendments is earnestly solicited. An early and favorable first action on the merits is earnestly solicited.

CONCLUSION

Should there be any outstanding matters that need to be resolved in the present application, the Examiner is respectfully requested to contact Mark E. Olds, Reg. No.

46,570, at the telephone number of the undersigned below, to conduct an interview in an effort to expedite prosecution in connection with the present application.

If necessary, the Commissioner is hereby authorized in this, concurrent, and future replies, to charge payment or credit any overpayment to Deposit Account No. 02-2448 for any additional fees required under 37 C.F.R. §§ 1.16 or 1.17; particularly, extension of time fees.

Respectfully submitted,

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Attachment: Version with Markings to Show Changes Made

VERSION WITH MARKINGS TO SHOW CHANGES MADE

In the Claims:

Claim 1 has been amended as follows:

1. (Amended) A moving picture encoding system for encoding each picture included in a sequence of moving pictures in units of a unit group comprised of a plurality of pictures including said each picture, said system comprising:

encoding control means for, when said unit group includes a plurality of different types of pictures which are to be encoded with different encoding methods, setting a target quantizer step size used to encode each of the different types of pictures included in said unit group, and for performing a control operation to generate and furnish a quantizer step size so that a ratio among the target quantizer step sizes set for the different picture types is a predetermined one, [wherein] said control operation [is determined in accordance with a feature of said sequence of moving pictures to be encoded which represents a degree of] **not being totally depending on the allocation of quantity of the target amount of codes based on the global complexity measure for each of the picture, but in accordance with features** of [said] **the** sequence of moving pictures [to be encoded]; and

encoding means for encoding said each picture included in said sequence of moving pictures including said each picture using said quantizer step size furnished by said encoding control means and using either said each picture or prediction from a past intra-coded image and/or a predictive coded picture.